REMARKS

Claims 1-3 and 7-11 are canceled. Claims 4-6 and 12-14 are pending in the instant application. Applicants respectfully submit that the amendments made herein are supported throughout the specification. For example, the "mineralization of nanofibers" and "mineralization occurs from initially dissolved mineral cations and anions along the nanofiber surfaces" is supported, for example, in the abstract. The "positive or negative" charge of the peptide amphiphile is supported, for example, in paragraphs [0028] and [0029]. Support for the C_6 hydrocarbon of the peptide amphiphile is "at its N-terminus" is found, e.g., in Table 1. Therefore, the amendments are supported in the specification and entry of these amendments is respectfully requested.

Continuing Data and Priority

The Office Action states that U.S. Provisional Appln. No. 60/425,536 does not provide adequate support for the claimed invention of claims 4-6 of the instant application. It concludes that this application is not accorded priority.

Applicants respectfully submit that this application is based on provisional applications, Appln. Nos. 60/425,689 and 60/425,536, both of which were filed on November 12, 2002. Applicants respectfully submit that the claims have been amended to provide for a method of mineralization, wherein "mineralization occurs from initially dissolved cations and anions along the nanofiber surfaces." Applicants respectfully submit that the provisional applications support the above-mentioned amendments and, as such, should be accorded the benefit of the filing date of November 12, 2002.

35 USC 112, First Paragraph

Claims 4-6 and 12-14 are rejected under 35 USC 112, first paragraph, as allegedly failing to comply with the written description requirement. It is stated that the limitation of "minerals nucleate at the nanofiber surface," as amended into claim 4 on 21 August 2007, is not supported in the specification as originally filed. Applicants respectfully disagree for the reasons of record. However, in an effort to expedite prosecution of this application, Applicants have amended claim 4 to recite that "mineralization occurs from

initially dissolved mineral cations and anions along the nanofiber surfaces." This language is supported throughout the specification. For example, the application recites: "templated mineralization of the initially dissolved mineral cations and anions in the mixture occurs with preferential orientation of the mineral crystals along the fiber surfaces within the nanofiber gel." (Abstract.) Therefore, the amended claim is clearly supported and withdrawal of the rejection is respectfully requested.

Furthermore, Applicants disagree that the language "peptide amphiphile has a net ionic charge" is not supported in the present specification. In fact, Applicants respectfully submit that (1) one having ordinary skill in the art would readily appreciate the plain meaning of "net ionic charge" and (2) the specification clearly provides support for this claim limitation. Nevertheless, in order to expedite prosecution of this case, Applicants have amended the claim to recite that the peptide amphiphile has a positive or negative charge. Support for this language is found throughout the specification. For example, the abstract states that "The composition is generally a solution comprised a first solution of a positively or negatively charged peptide-amphiphile..." Paragraph [0027] states that "[i]n one embodiment a composition ... comprises at least one negatively charged species of peptide-amphiphile..." Paragraph [0028] states that "[i]n another embodiment, a composition ... comprises a first solution of at least one positively charged species of peptide-amphiphile." In view of the foregoing, Applicants respectfully submit that these claim amendments are supported by the specification and withdrawal of this rejection is respectfully requested.

35 USC 103 – Wong et al.

Claims 4-6 and 14 are rejected under 35 USC 103 as allegedly being unpatentable over Wong et al. (*Nano Lett.* (2002 June) 2, 583-587). The rejection states that Wong describes a process of preparing SiO_2/Au composites on the surface of nanoparticles. The rejection states that net positively charged peptide amphiphiles ($Lys_{200}Cys_{30}$) are mixed with a positively charged solution of Au salts. This solution is then mixed with a negatively charged solution SiO_2 solution. It is stated that the mineral Au ions inherently nucleate sites for formation of gold nanoparticles. The rejection further emphasizes that

it Wong teaches a C_5 hydrocarbon and not a hydrocarbon component that is C_6 or greater. Nevertheless, the rejection provides that "[b]ecause N-terminal "HBr" portion of the amphiphile peptide is a protection moiety, this "C_5" is considered to be instant "C_6," as applied to claim 4. The rejection concludes that this modification of C_5 hydrocarbon to a C_6 hydrocarbon would have been obvious because "choosing the protection group having the hydrocarbon moiety longer than "C_5", which has been taught by Wong et al., is well within ordinary knowledge and skill of the one skilled in the art." Applicants respectfully traverse the rejection.

Applicants submit that making the "C_5" hydrocarbon moiety into a "C_6" hydrocarbon moiety is not obvious. The HBr salt of the (Lys)-(Cys) block-co-polymer in Wong does not "comprise a C_6 or greater hydrocarbon component" nor is such a modification made obvious from Wong. Wong does not teach a "C_5" hydrocarbon component as argued by the examiner. Rather, Wong teaches an HBr salt of lysine. The "BrH3N-(CH2)5-" depicted in Figure 1 is not a "protection group" for which the length of the carbon chain could be varied arbitrarily. Rather, it is merely the HBr salt of the side-chain on the C-terminal lysine peptide residue.

According to Wong, "[w]e synthesized poly-(L-lysine *x*-*b*-L-cysteine *y*) block copolymers ("Lys *x* Cys *y*") from suitably protected amino acid-*N*-carboxyanhydride monomers. . . " In this method, the N-carboxyanhydride monomer is prepared from "commercially available amino acids" (see Deming, T. J. *Nature* **1997**, *390*, 386. and Deming, T. J. *J. Polym. Sci. Part A: Polym. Chem.* **2000**, *38*, 3011) as cited by Wong. However, this method does not allow you to selectively control the length of the terminal residue. Rather, if one skilled in the art wished to incorporate a "C_6 or greater hydrocarbon component" in place of the "C_5" component (as suggested by the Examiner), this group would be incorporated on every amino acid side-chain, not just at the terminal residue. Since there is no natural amino acid with a "C_6 or greater hydrocarbon component" in its side chain, it would not have been "obvious" or "well within ordinary knowledge and skill" to use such a starting material in place of the naturally occurring and widely available lysine amino acid used by Wong. Indeed, in the papers by Deming (cited by Wong) all examples are with the naturally occurring lysine amino acid.

Therefore, Applicants respectfully submit that it would not have been obvious to merely modify the C_5 component to a C_6 component in Wong.

Furthermore, Applicants have amended claim 4 to provide that the C_6 or greater hydrocarbon is at the N-terminus of the peptide amphiphile. The Wong HBr salt, on the other hand, has the "HBr" at its N-terminus. As such, the Wong compound does not teach each and every element of the claims.

In addition, Applicants dispute the contention that nanorods are equivalent to the instant cylindrical micelles. Wong et al. use a diblock polypeptide (Lys)x-(Cys)y to form round, hollow spheres that are then used to bind pre-formed gold and silica nanoparticles from a sol suspension. Furthermore, on page 586 (bottom of first column), the authors state that by using different block lengths they can produce other shapes, such as "crumpled raisin-like shapes". The legend of Figure 4 even provides a "phase diagram" where they describe the shape of the assembly produced for different x and y of the (Lys)x-(Cys)y diblock polypeptide. The diagram presents three possibilities: S = sphere, R = raisin, F = film. Not only does this demonstrate that the Wong molecules could not be expected to form "fibrous cylindrical micelles", but it would seem to implicitly exclude that possibility.

Claim 4 has been amended to provide that ***mineralization of initially dissolved mineral cations and anions occurs along the nanofiber surface.*** Applicants respectfully submit that Wong does not describe the presence of ions of mineral salts along any nanofiber surface. There are silica (SiO_2) nanoparticles (termed n-Si Wong), which have a partial negative electrostatic charge on their surface, but they are not a salt ("salt" being defined as the product formed from the neutralization reaction of acids and bases), and are not an ion in solution ("ion" being defined as a atom or molecule having an ionic charge). There are also gold nanoparticles (termed n-Ag by Wong), but these are a metal with oxidation state Au(0). They are not a salt, do not have a net ionic charge (either the same or opposite the peptide) and, in fact, interact with the peptide through the gold-thiol bond with cysteine. Therefore, the presence of ions of mineral salts is not described in Wong.

Furthermore, Wong uses nanoparticles (n-Si and n-Au) that are separately pre-formed (having diameters of 10-12 nm and containing hundreds of atoms) and merely "stick" to the (Lys)x-(Cys)y diblock polypeptide assembly. In contrast, the instant application describes mineralization of cations and anions at the surface of the peptide amphiphile assembly, which is a different process of mineral formation.

In conclusion, Wong does not anticipate the claims as amended. Withdrawal of the rejection is respectfully requested.

CONCLUSION

Applicants believe that this amendment overcomes the outstanding rejections. Applicants, however, invite the Examiner to call the undersigned to discuss any remaining issues to expedite the prosecution of this application. The Commissioner is hereby authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-4582.

Respectfully submitted,

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